

Contextual Analysis of Remote Experimentation Using the Actor-Network Theory

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Abstract: Distance learning is promoting the adoption of several and new technological resources in education. The Internet is a proof of this trend, providing students with the ability of accessing better pedagogical contents from everywhere at anytime. This is usually supported by the so-called Virtual Learning Environments (VLEs). However, the increase of the bandwidth together with improvements in terms of the devices' processing capabilities for accessing services/tools through the internet, has contributed to the appearance of the Remote Experimentation (RE) concept. Currently adopted by several Science and Engineering (S&E) courses, RE is classified as a sub-domain of E-learning and as an extension of the traditional VLEs, since it provides all the facilities required for remotely accessing laboratorial experiments, giving both students and teachers the ability to control real experiments by using a simple device (e.g. PC, PDA, smart phone, etc.) connected to the internet. Traditional (in-place) laboratorial experiments can now be remotely controlled with more flexibility, reducing place and time restrictions usually present in a real laboratory. In addition, technological evolution is contributing to many changes in several domains, which has alerted us to the importance of contextualizing RE as a network of interconnected actors, with distinct characteristics and interests. This represents a huge challenge that is fundamental to analyse, since society, and more particularly the educational context, is faced with several unpredictable influences from technological innovations that may contribute to the adoption of various educational solutions some of which may not have been validated, particularly in S&E courses. Hence, this paper focuses on an analysis of RE based on the Actor-Network Theory (ANT) in order to understand the existing relationships between human and non-human (technological and/or conceptual) actors. The paper begins by contextualizing RE as an actor-network in an intersection of several contexts, namely the social, technical and educational. Further on, we map the actors and their associations. An analysis of the inclusion of a new actor into the RE actor-network, namely FPGA-based boards for accommodating Instruments and Modules (I&M), which are usually applied in remote laboratory infrastructures, is dealt with in the final section of this paper.

Keywords: Remote Experimentation, Remote laboratories, Weblabs, Actor-Network Theory, Technology adoption.